CLAIMS

1. An anode of a power generation cell for a solid oxide fuel cell,

wherein B-doped ceria particles (B is one or more of Sm, Gd, Y, and Ca) are separately attached to a frame surface of porous nickel having a network frame structure.

2. An anode of a power generation cell for a solid oxide fuel cell,

wherein B-doped ceria particles (B is one or more of Sm, Gd, Y, and Ca) having an average particle size of 0.2 to 0.6 μm (large diameter ceria particles) are separately attached to a frame surface of porous nickel having a network frame structure, and B-doped ceria particles having an average particle size of 0.01 to 0.09 μm (small diameter ceria particles) are separately attached between the large diameter ceria particles.

3. An anode of a power generation cell for a solid oxide fuel cell,

wherein the B-doped ceria particles of claim 1 or the B-doped ceria particles including the large diameter ceria particles and the small diameter ceria particles of claim 2 are expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of Sm, Gd, Y, and Ca, and $0<m\leq0.4$).

4. A power generation cell for a solid oxide fuel cell, comprising:

an electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the electrolyte; and

a porous anode which is formed on another side of the electrolyte,

wherein the anode is the anode according to any one of claims 1, 2, and 3.

5. The power generation cell for the solid oxide fuel cell according to claim 4,

wherein the lanthanum gallate-based oxide ion conductor is expressed by a formula of $La_{1-X}Sr_XGa_{1-Y-Z}Mg_YA_ZO_3$ (A is one or more of Co, Fe, Ni, and Cu, X is 0.05 to 0.3, Y is 0 to 0.29, Z is 0.01 to 0.3, and Y+Z is 0.025 to 0.3).

6. A solid oxide fuel cell comprising the power generation cell for the solid oxide fuel cell according to claim 4 or 5.

7. A power generation cell for a solid electrolyte fuel cell, comprising:

a solid electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the solid electrolyte; and

a porous anode which is formed on another side of the solid electrolyte,

wherein the anode includes a sintered body of B-doped ceria expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of Sm, Gd, Y, and Ca, and $0<m\leq0.4$) and nickel, B-doped ceria particles are separately attached to a frame surface of nickel having a porous frame structure in the sintered body, the sintered body has a nickel composition gradient so that a nickel content is increased in a thickness direction, the nickel content of an innermost surface of the sintered body which is in contact with the solid electrolyte is 0.1 to 20 vol%, and the nickel content of an outermost surface of the sintered body which is farthest from the solid electrolyte is 40 to 99 vol%.

8. A power generation cell for a solid electrolyte fuel cell, comprising:

a solid electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the solid electrolyte; and

a porous anode which is formed on another side of the solid electrolyte,

wherein the anode includes a sintered body of B-doped ceria expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of Sm, Gd, Y, and Ca, and $0<m\leq0.4$) and nickel, the sintered body includes a plurality of layers which has different nickel contents and in which B-doped ceria particles are separately attached to a frame surface of nickel having a porous frame structure, and the layers having the different nickel contents include an innermost layer, which is in contact with the solid electrolyte and has the nickel content of 0.1 to 20 vol%, and an outermost layer, which is separated from the solid electrolyte at least by the innermost layer and has the nickel content of 40 to 99 vol%.

9. A power generation cell for a solid electrolyte fuel cell, comprising:

a solid electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the solid electrolyte; and

a porous anode which is formed on another side of the solid electrolyte,

wherein the anode includes a sintered body of B-doped ceria expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of

Sm, Gd, Y, and Ca, and $0<m\leq 0.4$) and nickel, the sintered body includes a plurality of layers which has different nickel contents and in which B-doped ceria particles are separately attached to a frame surface of nickel having a porous frame structure, the layers having the different nickel contents include an innermost layer, which is in contact with the solid electrolyte and has the nickel content of 0.1 to 20 vol%, an outermost layer, which is layered so as to be farthest from the solid electrolyte and has the nickel content of 40 to 99 vol%, and an intermediate layer, which is formed between the innermost and the outermost layers and has a single layer or two or more layers, and the intermediate layer including the single layer or two or more layers is layered so that the nickel content is continuously or intermittently increased in the direction from the innermost layer to the outermost layer which is farthest from the solid electrolyte.

10. A power generation cell for a solid electrolyte fuel cell, comprising:

a solid electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the solid electrolyte; and

a porous anode which is formed on another side of the

solid electrolyte,

wherein the anode includes a sintered body of B-doped ceria expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of Sm, Gd, Y, and Ca, and $0<m\leq0.4$) and nickel, the sintered body includes B-doped ceria particles, which have an average particle size of 0.2 to 0.6 μm (large diameter ceria particle) and which are separately attached to a frame surface of nickel having a porous frame structure, and B-doped ceria particles, which have an average particle size of 0.01 to 0.09 μm (small diameter ceria particle) and which are separately attached between the large diameter ceria particles, the sintered body also has a nickel composition gradient so that the nickel content is increased in a thickness direction, the nickel content of an innermost surface of the sintered body which is in contact with the solid electrolyte is 0.1 to 20 vol%, and the nickel content of an outermost surface of the sintered body which is farthest from the solid electrolyte is 40 to 99 vol%.

11. A power generation cell for a solid electrolyte fuel cell, comprising:

a solid electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the solid electrolyte; and

a porous anode which is formed on another side of the solid electrolyte,

wherein the anode includes a sintered body of B-doped ceria expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of Sm, Gd, Y, and Ca, and $0<m\leq0.4$) and nickel, the sintered body includes a plurality of layers which has different nickel contents and in which large diameter ceria particles are separately attached to a frame surface of nickel having a porous frame structure and small diameter ceria particles are separately attached between the large diameter ceria particles, and the layers having the different nickel contents include an innermost layer, which is in contact with the solid electrolyte and has the nickel content of 0.1 to 20 vol%, and an outermost layer, which is separated from the solid electrolyte at least by the innermost layer and has the nickel content of 40 to 99 vol%.

12. A power generation cell for a solid electrolyte fuel cell, comprising:

a solid electrolyte which is formed of a lanthanum gallate-based oxide ion conductor;

a porous cathode which is formed on a side of the solid electrolyte; and

a porous anode which is formed on another side of the solid electrolyte,

wherein the anode includes a sintered body of B-doped ceria expressed by a formula of $Ce_{1-m}B_mO_2$ (B is one or more of Sm, Gd, Y, and Ca, and $0<m\leq0.4$) and nickel, the sintered body includes a plurality of layers which has different nickel contents and in which large diameter ceria particles are separately attached to a frame surface of nickel having a porous frame structure and small diameter ceria particles are separately attached between the large diameter ceria particles, the layers having the different nickel contents include an innermost layer, which is in contact with the solid electrolyte and has the nickel content of 0.1 to 20 vol%, an outermost layer, which is layered so as to be farthest from the solid electrolyte and has the nickel content of 40 to 99 vol%, and an intermediate layer, which is formed between the innermost and the outermost layers and has a single layer or two or more layers, and the intermediate layer including the single layer or two or more layers is layered so that the nickel content is continuously or intermittently increased in the direction from the innermost layer to the outermost layer which is farthest from the solid electrolyte.

13. The power generation cell for the solid electrolyte fuel cell according to any one of claims 8, 9, 11, and 12, wherein a thickness of the innermost layer is 0.5 to 5

μm, and a thickness of the outermost layer is 10 to 50 μm.

14. The power generation cell for the solid electrolyte fuel cell according to any one of claims 7, 8, 9, 10, 11, 12, and 13,

wherein the lanthanum gallate-based oxide ion conductor is expressed by a formula of $La_{1-X}Sr_XGa_{1-Y-Z}Mg_YA_ZO_3$ (A is one or more of Co, Fe, Ni, and Cu, X is 0.05 to 0.3, Y is 0 to 0.29, Z is 0.01 to 0.3, and Y+Z is 0.025 to 0.3).

15. A solid electrolyte fuel cell comprising the power generation cell for the solid electrolyte fuel cell according to any one of claims 7, 8, 9, 10, 11, 12, 13, and 14.